

# Data & Information for global change studies

NASA's Distributed Active Archive Centers  
and Cooperating Data Centers

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## ***Overview***

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The Earth Observing System (EOS) is an integral part of the National Aeronautics and Space Administration's (NASA's) Earth Science Enterprise (ESE). ESE is a long-term global change research program designed to improve our understanding of the Earth's interrelated processes involving the atmosphere, oceans, land surfaces, and polar regions. Data from EOS instruments and other Earth science measurement systems are useful in understanding the causes and processes of global climate change and the consequences of human activities.

The EOS Data and Information System (EOSDIS) provides a structure for data management and user services for products derived from EOS satellite instruments and other NASA Earth science data. Within the EOSDIS framework, the Distributed Active Archive Centers (DAACs) have been established to provide expertise in one or more Earth science disciplines. The DAACs and cooperating data centers provide data and information services to support the global change research community.

Much of the development of the DAACs has been in anticipation of the enormous amount of data expected from EOS instruments to be launched within the next two decades. Terra, the EOS flagship launched in December 1999, is the first of a series of EOS satellites to carry several instruments with multispectral capabilities. Some data products from these instruments are now available from several of the DAACs. These and other data products can be ordered through the EOS Data Gateway (EDG) and DAAC-specific online ordering systems.

### ***EOS Data Gateway***

Historically, scientists have had difficulty conducting interdisciplinary research. Locating useful data required contacting many different data centers for data holdings and availability. The EDG is designed to overcome that difficulty by allowing a user to search for and order data from one data center or a combination of data centers in a single online session. Based on client/server computing technology, the EDG accomplishes one of the goals of EOSDIS: To make global change research data more visible and accessible for interdisciplinary research.

For a detailed description of the EDG, its purpose, search-and-order capabilities, and accessibility, refer to the section on the EOS Data Gateway on page 4.

### ***DAACs: The Data Source***

The DAACs are responsible for data archival, product development and distribution, and user support. They are distinguished from one another by their different Earth science disciplines. Linked by the EDG, the DAACs appear to users as a single system. Users can search for and

order data from one or more data centers through the EDG, or they can contact the User Services staff at any data center to receive assistance in using this system or to obtain information about a particular data product.

Data products available from the DAACs are data sets, or groups of data sets, derived from EOS instruments and related Earth science measurement systems. EOS standard data products contain a wide range of physical, geophysical, biochemical, and other parameters and are available in a number of processed levels. As a service for users, the DAACs package groups of some of their most popular data sets and make them available on CD-ROM.

In addition to the search-and-order capabilities provided by the EDG, the DAACs have individual online systems that allow them to provide unique services for users of a particular type of data. The DAAC-specific systems look and function much like the EDG, but they emphasize products or services specific to the particular DAAC.

This booklet contains a section for each DAAC. The sections, presented alphabetically, provide information about each DAAC, its data holdings, data availability, and data access through the EDG and/or DAAC-specific online system. Contact information is provided in each section and is also summarized on the back of the cover.

### ***Cooperating Data Centers***

Other data centers cooperate with EOS by providing additional data and services. These centers include the Global Hydrology Resource Center (GHRC) and the National Oceanic and Atmospheric Administration (NOAA) data centers. In addition, several international data centers participate in interoperability programs through the Committee on Earth Observing Satellites (CEOS). Data from these international centers and several other data centers are visible through the EDG.

Sections for the cooperating data centers provide data product and contact information and are presented following the sections for the DAACs.

### ***Data Centers and Their Scientific Disciplines***

The following table lists the data centers and their areas of expertise. For information about any of the data centers, contact the center's User Services Office. Refer to the data center's section in this booklet for complete contact information.

## ***Data Centers and Disciplines***

### ***DAACs***

ASF DAAC Alaska SAR Facility	Synthetic Aperture Radar (SAR) Products and Polar Regions
EDC DAAC EROS Data Center	Land Processes
GSFC DAAC NASA Goddard Space Flight Center	Upper Atmosphere Atmospheric Dynamics Global Precipitation Global Biosphere
JPL DAAC NASA Jet Propulsion Laboratory	Physical Oceanography
LaRC DAAC NASA Langley Research Center	Radiation Budget Clouds Aerosols Tropospheric Chemistry
NSIDC DAAC National Snow and Ice Data Center	Snow and Ice Cryosphere and Climate
ORNL DAAC Oak Ridge National Laboratory	Biogeochemical Dynamics Terrestrial Ecology
SEDAC Socioeconomic Data and Applications Center	Human Interactions in the Environment

### ***Cooperating Data Centers***

GHRC Global Hydrology Resource Center	Global Hydrology
NOAA Data Centers National Oceanic and Atmospheric Administration	Environmental Data

## ***EOS Data Gateway***

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The purpose of the EOS Data Gateway (EDG) is to facilitate Earth science research through improved access to existing data and provide the search-and-order service for the EOSDIS Core System (ECS). The ECS is being built to accommodate the tremendous amount of data expected from a new series of EOS instruments, the first of which were launched on the Terra satellite in December 1999.

The EDG provides a consistent view of more than 1,200 data products held at several EOSDIS and international data centers. The system allows users, including those without specific knowledge of the data, to search science data holdings, retrieve high-level descriptions of data sets and detailed descriptions of the data inventory, view browse images, and place orders for data products. This service is accessible over the Internet via the World Wide Web.

### ***EDG Functionality***

#### **Search Types**

A search is done by specifying geographic areas of interest along with either geophysical parameter, data set name, or sensor name. Several other criteria such as source name, campaign, extended attribute, and time range may optionally be used. EDG searches on data sets and documents. Search options include a primary data search, quick data set lookup, data granule ID search, local granule ID search, and two document search methods.

The *Primary Data* search provides descriptions of specific observations or collections of observations of data (granules) that are available for request from a data center.

The *Data Set Lookup* feature lets a user type in a simple text string or common term to quickly obtain a list of data sets as a first step in the data search-and-order process.

The *Data Granule ID* search uses a set of characters that uniquely identify each granule of a data set in the system. Whereas, the *Local Granule ID* search is performed only on data obtained from EOS platforms, and it uses a series of characters that provide important information about the granule to the EOS scientist. Data granule IDs are created at the DAAC where the data granule (and parent data set) originates. These two search options are designed for advanced and knowledgeable users.

The *Summary Document* search provides summary information about EOSDIS data sets to help the user determine which data products are appropriate. Information is derived from the Global Change Master Directory (GCMD), a comprehensive directory of Earth science and

global change data. (The GCMD can be accessed directly at <http://gcmd.nasa.gov>.)

The *Detailed Document* search provides detailed descriptions for one or more data sets and related entities. The information is helpful for determining the location and content of each data set and its potential usefulness for a specific application, namely, data sources, instruments, projects, and data centers that archive and distribute the data.

### **Additional Functions**

The *order* function allows the user to select the desired data processing options and media. This function also allows the user to specify contact, billing, and shipping addresses.

The *coverage* map is a graphical representation of the geographic coverage of selected data observations (data granules).

The *browse* function allows the user to view data (possibly reduced in resolution) as an aid to selection for many of the products available from the data centers. Such data may be viewed in the EDG interface or retrieved via File Transfer Protocol (FTP).

### **Accessing the EDG**

The EDG uses a Web interface to provide access via the Internet to Earth science data and information from U.S. and international data centers. This interface is suitable for a wide range of Earth science data users—from users with limited computer resources interested in performing occasional, simple searches for data, to the professional Earth science researcher in need of executing complex data queries on a regular basis. The Web interface is available at

**<http://eos.nasa.gov/imswelcome>**

Simple instructions appear on the screen when a connection is made. No password or special account is necessary. The welcome screen contains an option to compose a search. Search criteria are specified by entering search keywords with optional spatial and temporal ranges as well as other search attributes, including geophysical parameters, data sources, and processing levels. Any number of search attributes may be selected.

When the search results are returned, summary and detailed descriptions are provided. Sample browse images are also provided for many of the data sets. A variety of media and formatting options are available depending on the data set.

For assistance or more information on using the EDG to search for and order data, contact the EDG Science Support Team via E-mail at [edg@killians.gsfc.nasa.gov](mailto:edg@killians.gsfc.nasa.gov), or contact any of the DAAC User Services Offices.

**Alaska SAR Facility**

The ASF DAAC is located in the Geophysical Institute at the University of Alaska, Fairbanks. It is supported by NASA to acquire, process, archive, and distribute synthetic aperture radar (SAR) data from polar-orbiting satellites to advance polar research and Earth science.

**Available Data**

ASF provides users with several types of data, including SAR data acquired from non-U.S. sources and higher level derived products.

**SAR Image Data Sets**

*European Remote-Sensing Satellites (ERS-1 and ERS-2) C-Band SAR Systems*—ERS-1 data are available for August 1991 through June 1996. ERS-2 data are available for August 1996 through the present (active mission). The side-looking radar has an incidence angle of 23 degrees and a 100-km-swath width. Primary ground coverage exists within a circle of 3,000-km radius about two receiving ground stations: ASF (Fairbanks, Alaska) and McMurdo Station (McMurdo, Antarctica). The data can be processed to resolutions ranging from 30 to 240 meters.

ASF has produced a sampler CD-ROM that provides examples of SAR data and derived products, along with descriptive text. The 79-image CD includes viewing software for PC DOS, Macintosh, and UNIX platforms, and is available without restriction. All images on the CD are also available through the home page.

*Japanese Earth Remote-Sensing Satellite (JERS-1) L-Band SAR System*—Data are available for May 1992 through October 1998. The side-looking radar has an incidence angle of 35 degrees and a 75-km-swath width. Coverage exists within a circle of 2,600-km radius centered on Fairbanks, at resolutions ranging from 10 to 240 meters. Limited coverage outside this mask, including extensive Amazon and Boreal forest data, is also available.

*RADARSAT-1 C-Band SAR System*—Data are available for February 1996 through the present (active mission). The side-looking radar has a range of incidence angles from approximately 20 to 60 degrees. Primary ground coverage exists within a circle of 3,000-km radius about two receiving ground stations: ASF (Fairbanks, Alaska) and McMurdo Station (McMurdo, Antarctica). The data can be processed to resolutions ranging from 30 to 600 meters. Significant coverage outside these station masks is also available.



*RADARSAT-1 SAR Mosaic of Antarctica*—This first, complete, high-resolution SAR map of Antarctica is a remarkable snapshot of the continent as it appeared during the fall of 1997. The RADARSAT-1 SAR Mosaic of Antarctica is a product of NASA's Pathfinder Project RADARSAT-1 Antarctic Mapping Program (RAMP). Canadian partners included the Canadian Space Agency (CSA), Canadian Centre for Remote Sensing (CCRS), and RADARSAT International (RSI). U.S. partners included Ohio State University, NASA's ASF, NASA's Jet Propulsion Laboratory (JPL), and the Vexcel Corporation. Additional support was provided by NASA's Goddard Space Flight Center (GSFC), the Environmental Research Institute of Michigan (ERIM), and the National Imagery and Mapping Agency (NIMA). This mosaic is available in 250-m resolution on CD-ROM and 125-m resolution via FTP.

*RADARSAT Geophysical Processor System (RGPS)*—This novel and sophisticated analysis tool uses RADARSAT ScanSAR B data to generate Arctic-wide sea ice information products every 6 days. This RADARSAT acquisition plan, called the Arctic Snapshot, serves the requirements of the National Ice Center and the RGPS. The tool was developed by JPL of the California Institute of Technology and is being monitored there.

A series of higher level products derived from SAR data is also available for distribution. Sea ice motion, ice type and concentration, and ocean wave products are produced from ERS-1 SAR data and are archived at ASF.

#### **SAR Data Distribution Policy**

ASF distributes SAR data to NASA-approved researchers. Information on becoming an approved researcher is available on ASF's Web site.

#### **Data Access**

Online access over the Internet is available through the EDG (see page 4).

**For assistance or more information, contact**

**ASF DAAC User Services  
University of Alaska Fairbanks  
P.O. Box 757320  
Fairbanks, Alaska 99775-7320 USA  
Phone: +1 907-474-6166; Fax: +1 907-474-2665  
E-mail: [asf@eos.nasa.gov](mailto:asf@eos.nasa.gov)  
Web: <http://www.asf.alaska.edu>**

**Earth Resources Observation Systems (EROS) Data Center**

The EDC DAAC promotes interdisciplinary study and understanding of the integrated Earth system by providing data for the investigation, characterization, and monitoring of biologic, geologic, hydrologic, ecologic, and related conditions and processes. In addition to current data sets, the EDC DAAC ingests, processes, distributes, and archives data for land-related EOS sensors.

**Available Data**

*Global 1-Kilometer Advanced Very High Resolution Radiometer (AVHRR)*—Data set products include stitched orbital segments and 10-day composites over various parts of the Earth and are composed of 5-channel, 10-bit, raw AVHRR data at 1.1-km resolution using NOAA's polar-orbiting Television and Infrared Observation Satellite (TIROS).

*Spaceborne Imaging Radar-C (SIR-C)*—The imaging radar system was launched aboard NASA Space Shuttles in 1994. SIR-C's unique contributions to Earth observation and monitoring are its capabilities to measure the radar signature of the surface at three different wavelengths and to make measurements for different polarizations at two of those wavelengths.

*Global 30-Arc-Second Elevation Data Set (GTOPO30)*—This data set provides 30- by 30-arc-second digital elevation data from several raster and vector sources. Data are available via FTP or on CD-ROM or 8-mm tape.

*Landsat Pathfinder*—The data sets result from cooperative research projects between NASA and several universities. The projects incorporate either Landsat Multispectral Scanner System (MSS) or Thematic Mapper (TM) data. The data sets consist of North American Land Characterization (NALC) Triplicates, the Humid Tropical Forest (HTF), the NASA Landsat Data Collection (NLDC), and the Global Land Cover Test Sites (GLCTS).

*Aircraft Scanners*—Data are NASA digital imagery of selected U.S. areas, acquired by airborne platforms. Available data sets are from TM Simulator (TMS), Thermal Infrared Multispectral Scanner (TIMS), and NS-001 sensors.

*Landsat 7 Enhanced Thematic Mapper (ETM+)*—Landsat 7 provides repetitive, synoptic coverage of continental surfaces; spectral bands in visible and near-infrared (30-m resolution), panchromatic (15 m), and thermal infrared (60 m) regions of the electromagnetic spectrum; and absolute radiometric calibration. Landsat 7 promotes interdisciplinary research via synergism with other EOS observations, especially those orbiting in tandem with the Terra satellite for near-coincident observations. EDC archives and distributes various products, including Level 0R formatted, Level 1 Radiometric, and Level 1 Geometric (i.e., systematic).

*Advanced Solid-state Array Spectrometer (ASAS)*—Data were collected from 1998 and 1999 by the ASAS sensor flown aboard NASA aircraft.

*Moderate Resolution Imaging Spectroradiometer (MODIS)*—Land discipline products (from June 2000) provide global coverage at 500-m and 1-km resolutions. Data sets are Level 2 and higher. Products include surface reflectance, land surface temperature, vegetation indices, fire anomalies, leaf area index, bidirectional reflectance distribution function and albedo, land cover change, vegetation cover conversion, and net primary production. The higher level data sets, produced from the Terra satellite, contribute toward global-to-regional monitoring, modeling, and assessment.

*Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER)*—Of the five instruments onboard Terra, ASTER offers the highest resolution image data in visible and near-infrared wavelengths (15 m), short-wave infrared wavelengths (30 m), and thermal infrared wavelengths (90 m). ASTER's purpose is to improve the understanding of local and regional phenomena of Earth's surface and atmosphere. Products include Level 1A, Level 1B, and eight on-demand products (e.g., brightness temperature, surface reflectance, digital elevation models).

*MODIS/ASTER Airborne Simulator (MASTER)*—This data set supports the MODIS and ASTER instrument teams in algorithm development, calibration, and validation from December 1998 to the present.

### ***Future Data Holdings***

The EDC DAAC will archive and distribute systematically corrected Level 1 orthorectified global MMS imagery collected during the mid 1970s and TM imagery collected about 1990.

The second MODIS instrument, Flight Model 1 (FM1), will be integrated on the Aqua (EOS PM-1) spacecraft, with an expected launch in 2001. EDC will archive and distribute various data sets derived from MODIS.

### ***Data Access***

Data orders may be placed at the EDC DAAC through the EDG (see page 4). Before placing orders, users are encouraged to use the EDG tutorial located at <http://edcdaac.usgs.gov/tutorial/>. Data are available by FTP or on a variety of media, including 8-mm cassette and CD-ROM.

**For assistance or more information, contact**

**EDC DAAC User Services  
EROS Data Center  
47914 252nd Street  
Sioux Falls, SD 57198-0001 USA**

**Phone: +1 605-594-6116; Fax: +1 605-594-6963  
E-mail: [edc@eos.nasa.gov](mailto:edc@eos.nasa.gov)  
Web: <http://edcdaac.usgs.gov>**

### **Goddard Space Flight Center**

GSFC DAAC supports data in upper atmospheric, atmospheric dynamics, global precipitation, and global biospheric disciplines.

#### **Available Data**

*Total Ozone Mapping Spectrometer (TOMS)*—Data contain global column ozone amounts and ultraviolet reflectivity at 1- x 1.25-degree resolution. Data are available from the Nimbus-7 and Meteor-3 satellites for November 1978 to December 1994. Data from the Advanced Earth Observing System (ADEOS) and Earth Probe (EP) missions will be acquired in the near future.

*Upper Atmosphere Research Satellite (UARS)*—Data contain profiles of upper atmospheric chemical constituents, winds, solar irradiance, and energetic particle input. Products from nine of the spacecraft's instruments are available as time- and latitude-ordered data sets from September 1991 through the present.

*Television and Infrared Observation Satellite (TIROS) Operational Vertical Sounder (TOVS)*—Pathfinder data contain global profiles of temperature, moisture, precipitation, cloudiness, and outgoing long-wave radiation at 1-degree resolution produced using improved algorithms. Data are available for 1978 through 1994.

*Sea-viewing Wide Field-of-view Sensor (SeaWiFS)*—Data contain oceanic pigment and chlorophyll concentrations and raw and water-leaving radiances. Data now available provide local, regional, and global coverage.

*Greenhouse Effect Detection Experiment (GEDEX)*—Data collection contains more than 60 data sets with parameters relevant to greenhouse gas research (surface and upper air temperatures, solar irradiances, radiation budget, clouds, and greenhouse gases). Coverage may be global, regional, or local, depending on the data set. Many data sets are available for a 10-year period spanning the 1980s.

*International Satellite Land Surface Climatology Project (ISLSCP) Initiative I: Global Data Sets for Land-Atmosphere Models*—Data contain near-surface meteorology, vegetation, biophysics, hydrology, radiation, soils, snow, and ice parameters. Monthly, monthly-6-hourly, and 6-hourly data are available globally on a 1-degree grid for 1987 through 1988.

*Nimbus-7 Coastal Zone Color Scanner (CZCS)*—Data contain 1-km and 4-km resolution radiance measurements, and pigment and chlorophyll concentrations and water-leaving radiances at 4-km and 20-km resolutions. Data are available for November 1978 through June 1986.

*Pathfinder Advanced Very High Resolution Radiometer (AVHRR)*—Data contain daily and 10-day global composites of terrestrial Normalized Difference Vegetation Index (NDVI) and atmospherically corrected radiances at 8-km resolution produced using improved algorithms. Data are available for 1981 to present.

*Goddard Data Assimilation Office (DAO)*—Four-dimensional, assimilated data contain global atmospheric profiles of model-generated winds, temperature, surface parameters, water vapor, and radiative heating at 2- x 2.5-degree resolution. Data are available for 1985 through 1993.

*Moderate Resolution Imaging Spectroradiometer (MODIS) Airborne Simulator (MAS)*—A 50-channel radiometer on a NASA ER-2 high-altitude aircraft. MAS data help define, develop, and test algorithms for the MODIS, a key EOS sensor. Its archive consists of nine campaigns and a number of noncampaign-related data sets and is growing continuously. Because of the volume, data are maintained and distributed on tape. The MAS Web site is at [http://daac.gsfc.nasa.gov/CAMPAIGN\\_DOCS/MAS/mas\\_home.html](http://daac.gsfc.nasa.gov/CAMPAIGN_DOCS/MAS/mas_home.html).

*Tropical Ocean Global Atmosphere-Coupled Ocean Atmosphere Response Experiment (TOGA-COARE)*—Data contain field observations of radiation, cloud, and precipitation parameters in the tropical Pacific collected from surface-, aircraft-, and satellite-based instruments. Data are available for November 1992 to February 1993.

*Tropical Rainfall Measuring Mission (TRMM)*—Data contain visible, infrared, and microwave observations of tropical and subtropical rain systems daily at 4-km resolution, and spatially and temporally resampled data over 5-day and monthly periods at 1- and 5-degree resolutions, respectively. Data are available for December 1997 through the present and can be accessed at <http://lake.nascom.nasa.gov/DATA/TRMM/index.html>.

*MODIS*—The key instrument onboard Terra, acquiring 36 discrete spectral bands between 0.4 and 14.5  $\mu\text{m}$ , MODIS provides long-term observations. The instrument views the entire Earth's surface every 1 to 2 days and is expected to contribute greatly to understanding interrelated Earth processes. The GSFC DAAC MODIS data holdings consist of radiometric and geolocation products (released April 2000) and atmosphere and ocean products (released September/October 2000). MODIS data products can be accessed at <http://acdisx.gsfc.nasa.gov/data/>.

### **Data Access**

Data may be ordered over the Internet through the EDG (see page 4).

**For assistance or more information, contact**

**Goddard DAAC User Services  
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Greenbelt, MD 20771 USA**

**Phone: +1 301-614-5224; Fax: +1 301-614-5268**

**E-mail: [gsfc@eos.nasa.gov](mailto:gsfc@eos.nasa.gov) or [daacuso@daac.gsfc.nasa.gov](mailto:daacuso@daac.gsfc.nasa.gov)**

**Web: <http://daac.gsfc.nasa.gov>**

**Jet Propulsion Laboratory**

The mission of the JPL Physical Oceanography (PO) DAAC is to serve the needs of the oceanographic and interdisciplinary science research communities and the education community. The JPL PO.DAAC achieves its mission by providing oceanographic data from spaceborne instruments and producing and distributing higher level data products.

**Available Data**

The products available from the JPL PO.DAAC are largely satellite derived and include ocean wind, sea surface height, sea surface temperature, atmospheric moisture, heat flux, and in situ data as they pertain to satellite data. These products are derived from instruments that include the TOPEX/Poseidon altimeters, the SeaWinds on QuikSCAT scatterometer, the NASA Scatterometer (NSCAT), the NOAA Advanced Very High Resolution Radiometer (AVHRR), the Defense Meteorological Satellite Program (DMSP) Special Sensor Microwave/Imager (SSM/I) radiometers, the European Remote Sensing (ERS) satellite altimeters, and the Seasat scatterometer and altimeter. Data highlights are listed below.

**Ocean Wind**

*SeaWinds on QuikSCAT*—The Level 2B data set contains ocean wind speed and direction along the instrument swath. The Level 3 data set includes daily ocean wind speed and direction on a 25-km global grid. Browse images and online subsetting capabilities are forthcoming.

*NSCAT*—Data products include values of wind speed, direction, and pseudostress over the open ocean for September 1996 to June 1997. Global sigma-0 data, browse images, and online subsetting are also available.

**Sea Surface Height**

*TOPEX/Poseidon Merged Geophysical Data Record (MGDR)-B*—Data set contains global, alongtrack data from both the NASA and CNES (French Space Agency) altimeters aboard the TOPEX/Poseidon satellite, with high-precision orbits and environmental corrections.

*TOPEX/Poseidon Sea Surface Anomaly*—Sea surface height with respect to the mean sea surface, as derived from the TOPEX/Poseidon MGDR-B data.

Other data products include reprocessed data from the ERS-1 altimeter. Also, TOPEX/Poseidon near-real-time alongtrack data and grids of water vapor and wave height are available online.

### **Sea Surface Temperature**

*AVHRR Oceans Pathfinder Global Equal Angle Best-Pixel and All-Pixel Sea Surface Temperature (SST)*—Daily data at 9-km and coarser resolutions can be accessed and subset online.

*Global Ocean Surface Temperature Atlas Plus (GOSTAplus)*—A 150-year gridded, monthly, 2.5-degree SST climatology.

Other data sets include *ERS Along Track Scanning Radiometer-2 (ATSR-2) Gridded Brightness Temperatures*, *AVHRR Weekly Global 18-km Multi-Channel SST (MCSST)*, and *NCEP Reynolds Historical Reconstructed and Optimally Interpolated SST Data Sets*.

### **Software Products**

*Atlas of Ocean Sections CD-ROM*—Contains hydrographic data and related software, including *Power OceanAtlas* for the Macintosh and *ATLAST* and *Ocean Data View* for the PC.

### **Future Data Holdings**

Planned products include an 8-day, 9-km AVHRR DVD-ROM set that is collocated with SeaWiFS (data now available electronically), and selected SSTs from ATSR. JPL will archive and distribute products derived from the Jason-1 altimetry mission, the GRACE gravity mission, and the SeaWinds scatterometer on ADEOS-II.

### **Data Access**

Information on the JPL PO.DAAC and a catalog of products and educational information can be accessed through the Web site. Investigators may subscribe to the JPL PO.DAAC data-news bulletins.

An online search-and-order service is also available through the EDG (see page 4).

**For assistance or more information, contact**

**JPL PO.DAAC User Services  
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E-mail: [jpl@eos.nasa.gov](mailto:jpl@eos.nasa.gov) or [podaac@podaac.jpl.nasa.gov](mailto:podaac@podaac.jpl.nasa.gov)  
Web: <http://podaac.jpl.nasa.gov>  
FTP: [podaac.jpl.nasa.gov](ftp://podaac.jpl.nasa.gov)**

## **Langley Research Center**

The Langley DAAC supports more than 30 projects and has more than 300 archived data sets relating to radiation budget, clouds, aerosols, and tropospheric chemistry. These data sets were obtained from satellite measurements, as well as field experiments.

### **Available Data**

#### **Radiation Budget**

Radiation budget data sets contain information related to the variability of total solar irradiance, top of atmosphere and surface radiation properties, effects of clouds on the energy budget, as well as data useful for solar energy technologies.

- *Active Cavity Radiometer Irradiance Monitor (ACRIM II and III)*
- *Atmospheric Radiation Measurement (ARM) Enhanced Shortwave Experiment (ARESE)*
- *Clouds and the Earth's Radiant Energy System (CERES)*
- *Earth Radiation Budget Experiment (ERBE)*
- *Multi-angle Imaging SpectroRadiometer (MISR)*
- *Nimbus-7 Earth Radiation Budget (ERB)*
- *Sulfates/Smoke, Clouds, and Radiation (SCAR)*
- *Surface Radiation Budget (SRB)*
- *Surface Solar Energy (SSE)*

#### **Clouds**

Cloud data sets contain information on the radiative properties of clouds; cirrus, marine stratus, and arctic cloud field studies; and subsonic aircraft effects on contrails and other cloud systems.

- *International Satellite Cloud Climatology Project (ISCCP)*
- *First ISCCP Regional Experiment (FIRE)*
- *SUBsonic aircraft: Contrail & Cloud Effects Special Study (SUCCESS)*

#### **Aerosols**

Aerosol data sets contain satellite and lidar-derived information on the spatial and vertical distribution of stratospheric and tropospheric aerosols, as well as direct radiative impacts and chemical, physical, and optical properties of aerosols.

- *48-inch Light Detection and Ranging (48" LIDAR) Aerosol Research Branch (ARB)*
- *Lidar Atmospheric Sensing Experiment (LASE)*
- *Lidar In-space Technology Experiment (LITE)*



- *Polar Ozone and Aerosol Measurement II (POAM II)*
- *Stratospheric Aerosol and Gas Experiment (SAGE)*
- *Stratospheric Aerosol Measurement II (SAM II)*
- *Tropospheric Aerosol Radiative Forcing Observational eXperiment (TARFOX)*

#### **Tropospheric Chemistry**

Tropospheric chemistry includes geographic and temporal distribution of biomass burned, concentrations of key chemical species, and distribution and behavior of tropospheric carbon monoxide, ozone, and water vapor.

- *Biomass Burning*
- *Global Tropospheric Experiment (GTE)*
- *LASE*
- *Measurement of Air Pollution from Satellites (MAPS)*
- *Measurements of Pollution in the Troposphere (MOPITT)*
- *North American Research Strategy for Tropospheric Ozone (NARSTO)*
- *NASA Water Vapor Project (NVAP)*
- *Scanning Multichannel Microwave Radiometer (SMMR)*
- *Special Sensor Microwave/Imager (SSM/I)*

#### **Future Data Sets**

Data obtained from the following projects will be archived at the Langley Atmospheric Sciences Data Center.

- *CERES (Aqua)*
- *Pathfinder Instruments for Cloud and Aerosol Spaceborne Observations- Climatologie Etendue des Nuages et des Aerosols (PICASSO-CENA)*
- *SAGE III*
- *Tropospheric Emission Spectrometer (TES)*

#### **Data Access**

Access to data, data search and order, and information about the Langley Atmospheric Sciences Data Center can be found at the Web site listed below. Online access is also available through the EDG (see page 4).

**For assistance or more information, contact**

**Science, User, and Data Services  
NASA Langley Research Center, MS 157D  
2 South Wright Street  
Hampton, VA 23681-2199 USA**

**Phone: +1 757-864-8656; Fax: +1 757-864-8807**

**E-mail: [larc@eos.nasa.gov](mailto:larc@eos.nasa.gov)**

**Web: <http://eosweb.larc.nasa.gov>**

**National Snow and Ice Data Center**

The NSIDC DAAC provides data and information on snow and ice processes, especially interactions among snow, ice, atmosphere, and ocean in support of research in global change detection and model validation. NSIDC also provides general data and information services to the cryospheric and polar processes research community.

**Available Data****Passive Microwave and AVHRR Products**

*Nimbus-7 Scanning Multichannel Microwave Radiometer (SMMR)*—Includes gridded brightness temperatures, sea ice type, extent, and concentration.

*Defense Meteorological Satellite Program (DMSP) Special Sensor Microwave/ Imager (SSM/I)*—Includes gridded brightness temperatures, sea ice type, extent, and concentration. Near-real-time brightness temperature, sea ice concentration, and snow extent data are also available.

*Advanced Very High Resolution Radiometer (AVHRR) 1-km Level 1b Polar Data Set*—AVHRR scenes (1.1-km resolution at nadir, unprocessed raw data) for both polar regions.

*Northern Hemisphere Equal Area SSM/I Earth (EASE)-Grid Weekly Snow Cover and Sea Ice Extent*—Combines snow cover and sea ice extent at weekly intervals for October 1978 through August 1995, and snow cover alone for January 1971 through October 1978.

*Near-Real-Time SSM/I EASE-Grid Daily Global Ice Concentration and Snow Extent*

**Altimetry and Elevation Data**

*Sea Satellite (Seasat) and Geodetic Satellite (Geosat) Altimetry Data for the Antarctic and Greenland Ice Sheets*

*Digital Synthetic Aperture Radar (SAR) Mosaic and Elevation Map of the Greenland Ice Sheet*

*RADARSAT Antarctic Mapping Project (RAMP)*—Digital Elevation Model (DEM) data for Antarctica.

**Polar Atmospheric Data**

*The Historical Arctic Rawinsonde Archive*—Contains records from approximately one-half million soundings in the Arctic.

*Arctic Water Vapor Characteristics From Rawinsondes*—Data set based on records from approximately one-half million soundings in the Arctic from 1954 to 1991.

*Television Infrared Observation Satellite (TIROS) Operational Vertical Sounder (TOVS) Pathfinder Path-P Daily Arctic Gridded Atmospheric Parameters*—Fourteen gridded parameters, including atmospheric temperature, water vapor, skin surface temperature, cloud fraction, surface and cloud top pressure, and emissivity from July 1979 to December 1998.

#### **Other Data**

*Polar Pathfinder Sampler: Combined AVHRR, SMMR-SSM/I, and TOVS Time Series and Full-Resolution Samples*—Sample data, time-series visualizations, and browse products for temporal and spatial subsets of AVHRR, SMMR-SSM/I, and TOVS data sets to illustrate the types of products available for the various data sets.

*Moderate Resolution Imaging Spectroradiometer (MODIS) L2 Daily and L3 Daily and 8-Day Snow Cover Extent Products* (For more information, see NSIDC's Web site.)

#### **Additional Products**

The NSIDC DAAC and its host, the collocated National Snow and Ice Data Center, distribute additional data sets and products outside EOSDIS, including some managed for the NOAA National Geophysical Data Center and the National Science Foundation (NSF) Arctic System Science Data Coordination Center. (For more information, see NSIDC's Web site or contact User Services.)

#### **Future Data Holdings**

Planned products include the AVHRR Polar Pathfinder series, consisting of 1.25-km and 5-km temperature, albedo, cloud mask, and angle files. Other products include ice sheet topography, cloud and atmospheric properties, and other ocean, land, and sea ice products from the Geoscience Laser Altimeter System (GLAS); and cloud properties, radiative energy flux, precipitation, sea surface temperature, sea ice, snow cover, and sea surface wind fields from the Advanced Microwave Scanning Radiometer-Earth Observing System (AMSR-E) and V0-SSM/I.

#### **Data Access**

Data orders may be placed at the NSIDC DAAC through the EDG (see page 4). Users may also access information on NSIDC data holdings through the online data catalog accessible from NSIDC's Web site. Depending on the data set, NSIDC data products are available on a variety of media, including CD-ROM, floppy disks, 8-mm tapes, and FTP.

**For assistance or more information, contact**

**NSIDC DAAC User Services  
National Snow and Ice Data Center  
449 UCB, University of Colorado  
Boulder, CO 80309-0449 USA**

**Phone: +1 303-492-6199; Fax: +1 303-492-2468**

**E-mail: [nsidc@eos.nasa.gov](mailto:nsidc@eos.nasa.gov) or [nsidc@kryos.colorado.edu](mailto:nsidc@kryos.colorado.edu)**

**Web: <http://nsidc.org>**

## Oak Ridge National Laboratory

The ORNL DAAC provides data and information about the dynamics between the biological, geological, and chemical components of the Earth's environment. These dynamics are influenced by interactions between organisms and their physical surroundings, including soils, sediments, water, and air.

### Available Data

The ORNL DAAC maintains three broad types of data:

- Field campaign data: ground-, aircraft-, and satellite-based measurements of biogeochemical features in specific ecosystems.
- Land validation data: ground-based measurements used to assess EOS remote-sensing data products.
- Regional and global data: measurements used to drive and validate models of terrestrial ecosystem properties and processes.

### Field Campaign Data

Five major field campaigns are represented.

*Boreal Ecosystem–Atmosphere Study (BOREAS), 1994–1996*

*First ISLSCP (International Satellite Land Surface Climatology Project)*

*Field Experiment (FIFE), 1987–1989*

*Large Scale Biosphere–Atmosphere Experiment in Amazonia (LBA), background data for the ongoing project*

*Oregon Transect Ecosystem Research (OTTER), 1990–1991*

*Superior National Forest (SNF), 1983–1984*

Data from the intensive field campaigns include

- Fluxes of heat, moisture, carbon dioxide, and radiation
- Soil properties
- Characteristics of the atmospheric boundary layer (wind, temperature)
- Vegetation indices (species, leaf angle, leaf area index, light wand data, leaf moisture)
- Surface radiance and biology data (photosynthesis, leaf chlorophyll, biomass, leaf area index)
- Meteorology
- Satellite measurements

### Land Validation Data

*Accelerated Canopy Chemistry Program (ACCP)*—Field, laboratory, and remote-sensing data characterizing the chemical composition of vegetation canopies in the United States. 1992–1993.

*EOS Land Validation*—Ground-based data used to validate and understand the uncertainties of remote-sensing images. 1999–present.

*FLUXNET*—Measurements of carbon dioxide, energy, and water vapor fluxes from towers throughout the world. 1990–present.

### **Regional and Global Data**

*Climate*—U.S. climate data, regional and global climate model scenarios, and long-term global climate data, including temperature, precipitation, humidity, solar radiation, wind velocity, and sea-level pressure. Dates range between 1753 and 1999.

*Hydroclimatology*—Precipitation and streamflow data for the continental United States, global river discharge data, and global wetland and inundation data. Dates range between 1807 and 1991.

*Soil*—U.S. and global data about soil properties, including depth, texture, conductivity, chemical content, pH, and temperature. Dates range between 1940 and 1996.

*Vegetation*—Data characterizing the distribution of vegetation types in the United States as well as biomass and net primary productivity (NPP) in grasslands and forests worldwide. The ORNL DAAC also holds data from the international Vegetation-Ecosystem Modeling and Analysis Project (VEMAP). Dates of vegetation holdings range between 1895 and 1996.

### **Future Data Holdings**

The ORNL DAAC plans to archive further data from LBA and data related to forest and grassland litter for 600 sites worldwide, as well as leaf area index. The ORNL DAAC will also archive data from SAFARI 2000, a field and remote-sensing campaign in southern Africa from 1999 to 2001.

### **Data Access**

Data are available through the ORNL DAAC's online search-and-order system at <http://www.daac.ornl.gov>. Online access is also available through the EDG (see page 4).

**For assistance or more information, contact**

**ORNL DAAC User Services  
Oak Ridge National Laboratory  
P.O. Box 2008, MS-6407, Bldg. 1507  
Oak Ridge, TN 37831-6407 USA**

**Phone: +1 865-241-3952; Fax: +1 865-574-4665  
E-mail: [ornl@eos.nasa.gov](mailto:ornl@eos.nasa.gov) or [ornldaac@ornl.gov](mailto:ornldaac@ornl.gov)  
Web: <http://www.daac.ornl.gov/>**

**Socioeconomic Data and Applications Center**

The Socioeconomic Data and Applications Center is collocated with and operated by the Center for International Earth Science Information Network (CIESIN) at Columbia University. SEDAC focuses on human interactions in global environmental change and on providing products and services for decision making that combine Earth science and socioeconomic data. SEDAC provides a directory of socioeconomic data and acts as an "Information Gateway" for improving the exchange of data and information between Earth and socioeconomic scientists.

**Available Data**

*Gridded Population of the World (Version 2)*—The Gridded Population of the World data include population estimates and densities for 1990 and 1995 on a 2.5' grid. Data adjusted to match United Nations national population estimates for 1990 and 1995 are also available. The land area, population counts, and densities for each 2.5' grid cell are available for the globe and six continental regions. Additionally, land area and population counts are available for each country.

*Archive of Census-Related Products*—The archive consists of extracts of 225 frequently requested demographic variables from the 1990 U.S. Census Summary Tape File (STF) 3A, digital boundary files reprocessed from the U.S. Census Topologically Integrated Geographic Encoding Referencing (TIGER) files, and enhanced county-to-county migration files.

*China Dimensions Data Collection*—China Dimensions is a rich collection of data resources for the People's Republic of China. Highlights include digital administrative boundaries; fundamental Geographic Information System (GIS) layers; county-level data on population, agriculture, economics, and hospitals; and interactive access to the 1982 census of population.

*Georeferenced Population Datasets of Mexico*—This collection includes GIS and time series data on Mexico's population, including a 1-km gridded population dataset and a time series of urban population change for 1921 through 1990.

**Other SEDAC Services**

*US-Mexico Demographic Data Viewer*—An application that provides rapid, interactive data mapping, viewing, and analysis of more than 200 socioeconomic variables that are congruent between the United States and Mexico. A useful tool for browsing and visualizing patterns at

geographic levels ranging from regions to counties/municipios, the *US-Mexico DDViewer* may be used to create customized maps of population, health, and other socioeconomic characteristics using a Java-enabled Internet browser.

*Special Report on Emissions Scenarios*—Forty scenarios of future greenhouse gas emissions prepared by Working Group III of the Intergovernmental Panel on Climate Change. The scenarios can assist in climate change analysis, including climate modeling and the assessment of impacts, adaptation, and mitigation.

*Ozone and Human Health*—A suite of information products in the areas of ultraviolet (UV) radiation, ozone, and human health impacts of UV exposure, including near-real-time UV dose estimates using Earth Probe (EP)/Total Ozone Mapping Spectrometer (TOMS) ozone data.

*Environmental Treaties and Resource Indicators (ENTRI)*—A searchable relational database containing international environmental treaties, treaty summaries, treaty status files, and global natural resource indicator data.

### **Data Access**

#### **SEDAC Data and Information Catalog Services**

SEDAC has developed an electronic gateway to provide access to the catalogs of a diverse international group of data archives and other institutions. The distributed search interface is available on the Web at

**<http://www.gateway.ciesin.org>**

**For assistance or more information, contact**

**SEDAC User Services  
CIESIN at Columbia University  
P.O. Box 1000  
61 Route 9W  
Palisades, NY 10964 USA**

**Phone: +1 845-365-8920; Fax: +1 845-365-8922  
E-mail: [sedac@eos.nasa.gov](mailto:sedac@eos.nasa.gov) or [ciesin.info@ciesin.columbia.edu](mailto:ciesin.info@ciesin.columbia.edu)  
Web: <http://sedac.ciesin.columbia.edu>**

**Marshall Space Flight Center**

The Global Hydrology Resource Center (GHRC) is the data management and user services arm of the Global Hydrology and Climate Center (GHCC). Located in Huntsville, Alabama, the GHRC provides data ingest, archive, processing, distribution, and other data networking services for the GHCC, national and international colleagues, and the general science community.

The GHRC supports product generation, archival, and distribution of research quality and operational lightning data sets for the Lightning Imaging Sensor onboard the Tropical Rainfall Measuring Mission (TRMM) satellite and the Optical Transient Detector onboard the MicroLab-1 satellite. The GHRC also distributes global tropospheric and stratospheric temperatures derived from the Advanced Microwave Sounding Unit and the Microwave Sounding Unit from the NOAA series. Additionally, several atmospheric and oceanic data sets are derived from both the TRMM Microwave Imager and the Special Sensor Microwave/Imager onboard the Defense Meteorological Satellite Program series, and aircraft remote-sensing data collected during the Convection and Moisture Experiment (CAMEX), Texas and Florida Underflights (TEFLUN), and First International Satellite Cloud Climatology Project (ISCCP) Regional Experiment-Arctic Cloud Experiment (FIRE-ACE) field experiments.

The GHRC's surface-based, remotely-sensed data sets are lightning ground strike data derived from the National Lightning Detection Network (these data are restricted to EOS investigators) and radar reflectivity data derived from the U.S. National Weather Service radar network.

Although GHRC's data holdings are primarily used by researchers investigating facets of the global hydrologic cycle, requests from researchers in all disciplines, kindergarten through high school and college educators and students, and others who desire Earth science data and information are welcome.

**Available Data****Lightning**

*Lightning Imaging Sensor (LIS) (December 1997 to the present) and Optical Transient Detector (OTD) (April 1995 to the present)*—The LIS and OTD are the world's first space-based sensors capable of detecting and locating lightning events during day and night conditions with high-detection efficiency. The sensors' purpose is to detect the full



spectrum of lightning flashes, including cloud-to-ground, cloud-to-cloud, and intracloud lightning events.

#### **Passive Microwave Products**

*Global Tropospheric and Stratospheric Deep Layer Temperatures*—Data derived from the Advanced Microwave Sounding Unit from May 1998 to the present and the Microwave Sounding Unit from January 1979 to the present.

*TRMM Microwave Imager Products*—Water vapor, cloud water, ocean wind speed, and sea surface temperatures from 1998 to the present.

*Special Sensor Microwave/Imager*—Antenna and brightness temperatures, water vapor, wind speed, and ocean wind speed from 1987 to the present (period of record is not complete for all parameters).

#### **Field Experiment Data Sets**

*Third Convection and Moisture Experiment (CAMEX-3)*—Hurricane research data sets observed during the 1998 Atlantic hurricane season. Data are derived from a variety of passive microwave, radar, infrared, visible, lidar, interferometer, electric field, and lightning instruments onboard the NASA ER-2 and DC-8 aircraft, as well as surface station instruments on Andros Island, Bahamas.

*Advanced Microwave Precipitation Radiometer (AMPR)*—Airborne passive microwave instrument data sets at 85 GHz, 37 GHz, 19 GHz, and 10 GHz onboard the NASA ER-2 during the CAMEX-1, CAMEX-2, TEFLUN, FIRE-ACE, and Convection and Precipitation Electrification Experiment (CaPE) field experiments.

#### **Data Access**

All data are provided free of charge. Access to data, data search and order, and information about GHRC's data sets can be found at the Web site listed below. Online access over the Internet is also available through the EDG (see page 4).

**For assistance or more information, contact**

**GHRC User Services  
Global Hydrology and Climate Center  
320 Sparkman Drive  
Huntsville, AL 35805 USA**

**Phone: +1 256-961-7932; Fax: +1 256-961-7859**

**E-mail: [ghrc@eos.nasa.gov](mailto:ghrc@eos.nasa.gov)**

**Web: <http://ghrc.msfc.nasa.gov/>**

**National Oceanic and Atmospheric Administration**

NOAA is charged with describing, protecting, and predicting changes in the Earth's environment and promoting global environmental stewardship. As part of NOAA, the National Environmental Satellite, Data, and Information Service (NESDIS) operates the U.S. civilian weather satellite program and maintains and distributes information from the world's largest repository of environmental data. All NESDIS Data Centers are members of the World Data Center System. The National Climatic Data Center (NCDC) provides weather and climate records; the Satellite Active Archive (SAA) supplies satellite data and imagery; the National Geophysical Data Center (NGDC) maintains geophysical information and paleoclimatological data; and the National Oceanographic Data Center (NODC) provides data from global oceans.

**For additional information or assistance, contact**

**NOAA National Data Centers  
DOC/NOAA/NESDIS  
151 Patton Avenue  
Asheville, NC 28801  
Web: <http://nndc.noaa.gov>**

**SAA**

**Phone: +1 828-271-4850  
Fax: +1 828-271-4876  
E-mail: [satorder@ncdc.noaa.gov](mailto:satorder@ncdc.noaa.gov)  
Web: <http://www.saa.noaa.gov>**

**NCDC**

**Phone: +1 828-271-4800  
Fax: +1 828-271-4876  
E-mail: [orders@ncdc.noaa.gov](mailto:orders@ncdc.noaa.gov)  
Web: <http://www.ncdc.noaa.gov>**

**NGDC**

**Phone: +1 303-497-6826  
Fax: +1 303-497-6513  
E-mail: [info@ngdc.noaa.gov](mailto:info@ngdc.noaa.gov)  
Web: <http://www.ngdc.noaa.gov>**

**NODC**

**Phone: +1 301-713-3277  
Fax: +1 301-713-3302  
E-mail: [services@nodc.noaa.gov](mailto:services@nodc.noaa.gov)  
Web: <http://www.nodc.noaa.gov>**



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 Web: <http://www.asf.alaska.edu>

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 Phone: +1 605-594-6116 Fax: +1 605-594-6963  
 E-mail: [edc@eos.nasa.gov](mailto:edc@eos.nasa.gov)  
 Web: <http://edcdaac.usgs.gov/>

GSFC DAAC—Upper Atmosphere, Atmospheric Dynamics,  
 Global Precipitation, Global Biosphere  
 Phone: +1 301-614-5224 Fax: +1 301-614-5268  
 E-mail: [gsfc@eos.nasa.gov](mailto:gsfc@eos.nasa.gov)  
 Web: <http://daac.gsfc.nasa.gov>

JPL DAAC—Physical Oceanography  
 Phone: +1 626-744-5508 Fax: +1 626-744-5506  
 E-mail: [jpl@eos.nasa.gov](mailto:jpl@eos.nasa.gov)  
 Web: <http://podaac.jpl.nasa.gov>

LaRC DAAC—Radiation Budget, Clouds, Aerosols,  
 Tropospheric Chemistry  
 Phone: +1 757-864-8656 Fax: +1 757-864-8807  
 E-mail: [larc@eos.nasa.gov](mailto:larc@eos.nasa.gov)  
 Web: <http://eosweb.larc.nasa.gov>

NSIDC DAAC—Snow and Ice, Cryosphere and Climate  
 Phone: +1 303-492-6199 Fax: +1 303-492-2468  
 E-mail: [nsidc@eos.nasa.gov](mailto:nsidc@eos.nasa.gov)  
 Web: <http://nsidc.org>

ORNL DAAC—Biogeochemical Dynamics, Terrestrial Ecology  
 Phone: +1 865-241-3952 Fax: +1 865-574-4665  
 E-mail: [ornl@eos.nasa.gov](mailto:ornl@eos.nasa.gov)  
 Web: <http://www.daac.ornl.gov>

SEDAC—Human Interactions in the Environment  
 Phone: +1 845-365-8920 Fax: +1 845-365-8922  
 E-mail: [sedac@eos.nasa.gov](mailto:sedac@eos.nasa.gov)  
 Web: <http://sedac.ciesin.columbia.edu>



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